(19) World Intellectual Property Organization International Bureau



1 OND 1 MARCH IN COLUM HAD BEEN BOTTO BOX 10 IO BEEN HAD 1810 BEEN BOX BOX AND BEEN BOX BOX AND BEEN BOX BOX B

(43) International Publication Date 20 October 2005 (20.10.2005)

PCT

(10) International Publication Number WO 2005/097676 A2

(51) International Patent Classification7:

C01B 31/02

(21) International Application Number:

PCT/US2005/010218

(22) International Filing Date: 23 March 2005 (23.03.2005)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/556,503

26 March 2004 (26.03.2004) U

- (71) Applicant (for all designated States except US): LUNA INNOVATIONS INCORPORATED [US/US]; 2851 Commerce Street, Blacksburg, Virginia 24060 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): STEVENSON, Steven, A. [US/US]; 508 Alleghany Street, Blacksburg, Virginia 24060 (US).
- (74) Agents: DADIO, Susan, M. et al.; Burns, Doane, Swecker & Mathis, LLP, P. O. Box 1404, Alexandria, Virginia 22313-1404 (US).

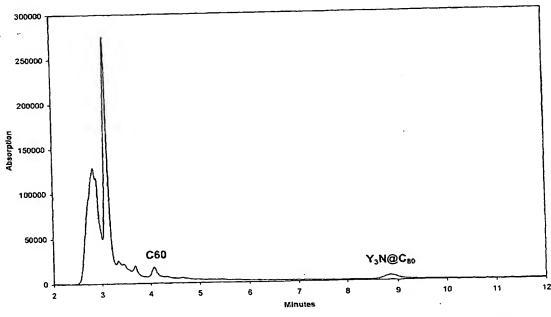
- (81) Designated States (unless otherwise indicated. for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

 without international search report and to be republished upon receipt of that report

[Continued on next page]

(54) Title: METHOD OF MAKING MULTIPLE CARBONACEOUS NANOMATERIALS



(57) Abstract: A method of making multiple carbonaceous nanomaterials is provided. Embodiments of the method can produce a reaction product that includes trimetaspheres, nanotubes, and at least one of fullerenes and metallofullerenes. A preferred embodiment of the method includes reacting at least one carbon source, nitrogen source, copper source, yttrium source, transition metal, and trimetasphere-forming metal in a reaction chamber. The reaction product can be produced by arc discharge in the presence of nitrogen gas.

₹ 919160/S

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.